



2011 - 2012 Highlights



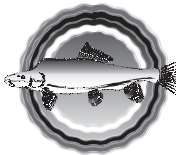
Upper Colorado River Endangered Fish Recovery Program

San Juan River Basin Recovery Implementation Program





Upper Colorado River
Endangered Fish
Recovery Program



San Juan River Basin
Recovery Implementation
Program

and

Implementing Innovative Solutions to Manage Water and Hydropower Resources While Recovering Endangered Species

Highlights 2011-2012

The Upper Colorado River Endangered Fish Recovery Program and the San Juan River Basin Recovery Implementation Program are using innovative, cost-effective measures to recover four species of endangered Colorado River fishes. At the same time, water and hydroelectric power resources are being managed within state and federal laws and tribal rights to meet the needs of people in growing western communities.

Program partners represent state and federal agencies, water and environmental organizations, power

customers, and American Indian tribes. These diverse interests continue to demonstrate that working cooperatively produces far greater results than independent efforts.

The recovery programs provide Endangered Species Act compliance for 2,320 federal, tribal, and non-federal water projects. The programs use adaptive management to evaluate and revise management actions as new information becomes available.

Highlights is produced annually to summarize the recovery programs' progress toward recovery of the endangered fishes. This document is not a publication of the U.S. Department of the Interior or its agencies.



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Reaching Out to Local Communities

The recovery programs work proactively to ensure the public is informed about endangered fish recovery actions. This occurs through the news media, public meetings, interpretive exhibits, water festivals and other events, newsletters, fact sheets, and websites.



Local students learn to identify native and nonnative fishes by helping Navajo Nation biologists sort the day's catch at the fish passage at the Public Service Company of New Mexico Weir on the San Juan River.



Visitors to the Dinosaur National Monument Visitor Center in northeast Utah get a close-up view of endangered razorback sucker. This species dates back 3 to 5 million years.



The recovery programs provide information at special events such as a Colorado River bus tour that stopped at the Grand Valley Project fish passage and screen in western Colorado.

Partners' Long-Term Commitment, Collaboration, and Active Participation Key to Recovery Programs' Success

The Upper Colorado River Endangered Fish Recovery and San Juan River Basin Recovery Implementation Programs have a broad range of partners that includes state and federal agencies, water development interests, power customers, American Indian tribes, and environmental organizations. Partners have made long-term commitments to set aside individual interests and work collaboratively to create innovative solutions that are helping achieve the recovery programs' goals of species recovery while water development occurs.



Upper Colorado River Endangered Fish Recovery Program

State of Colorado
State of Utah
State of Wyoming
Bureau of Reclamation
Colorado River Energy Distributors
Association
Colorado Water Congress
National Park Service
The Nature Conservancy
U.S. Fish and Wildlife Service
Utah Water Users Association
Western Area Power Administration
Western Resource Advocates
Wyoming Water Association

San Juan River Basin Recovery Implementation Program

State of Colorado
State of New Mexico
Jicarilla Apache Nation
Navajo Nation
Southern Ute Indian Tribe
Ute Mountain Ute Tribe
Bureau of Indian Affairs
Bureau of Land Management
Bureau of Reclamation
The Nature Conservancy
U.S. Fish and Wildlife Service
Water Development Interests

The Upper Colorado River Endangered Fish Recovery Program is recovering humpback chub, bonytail, Colorado pikeminnow, and razorback sucker in the Colorado River and its tributaries in Colorado, Utah, and Wyoming. The Recovery Program was initiated in 1988 with the signing of a cooperative agreement by the Governors of Colorado, Utah, and Wyoming; the Secretary of the Interior; and the Administrator of Western Area Power Administration. The cooperative agreement was extended through September 30, 2023.

The San Juan River Basin Recovery Implementation Program is recovering Colorado pikeminnow and razorback sucker in the San Juan River and its tributaries in Colorado, New Mexico, and Utah. The Recovery Program was established in 1992 with the signing of a cooperative agreement by the Governors of Colorado and New Mexico; the Secretary of the Interior; the Southern Ute Indian Tribe, the Ute Mountain Ute Tribe, and the Jicarilla Apache Nation. The cooperative agreement was extended through September 30, 2023.

State, Tribal, and Federal Leaders Endorse Recovery Program Accomplishments

For nearly 25 years, state, tribal, and federal leaders have supported the recovery programs for their cost-effective and collaborative on-the-ground achievements toward meeting the challenges of water development and management by western communities, while working toward conservation of endangered fish species. Based on the programs' successes, they are now models for other endangered species recovery efforts.

State Leaders Value Endangered Fish Recovery Programs' Accomplishments:

"The endangered fish recovery programs are models of collaborative, grassroots efforts that leverage cooperation from numerous stakeholders to ensure these remarkable ancient fish continue to swim in the Colorado River System. The programs support millions of people who depend on the river's water to grow food, generate electricity, and serve the needs of cities and towns."

John W. Hickenlooper, Governor, State of Colorado

"The programs have substantial support from the Upper Basin states of New Mexico, Colorado, Wyoming and Utah, the Navajo Nation, the Jicarilla Apache Nation, the Southern Ute Tribe, and the Ute Mountain Ute Tribe. Other water users, power customers, and environmental organizations are also active participants in the programs ... All of the partners contribute significantly to the success of the programs."

**Jeff Bingaman, United States Senator,
State of New Mexico**

"The success of the Upper Colorado River and San Juan River Endangered Species Recovery Programs is vital for Utah's continued use and development of Utah's Colorado River apportionment as part of our state's continued progress in providing for the needs of the citizens of Utah."

Gary R. Herbert, Governor, State of Utah

"Wyoming has been an active participant in the Recovery Program for 23 years, ensuring the recovery of four endangered fish species while allowing for the development of the Compact appropriations. It is imperative that the Recovery Program remains viable and continues to provide reasonable and practical alternatives to assure ESA compliance."

Matthew H. Mead, Governor, State of Wyoming

Tribal Leaders Stress Recovery Programs' Contributions:

"Jicarilla Apache Nation has been a participant in the San Juan River Basin Recovery Implementation Program since its inception in 1992, and I want to stress that the continuation of the Program is of the utmost importance to the Nation and the economic viability of the region."

Levi Pesata, President, Jicarilla Apache Nation

"The Navajo Nation is an active participant in, and strong supporter, of the San Juan River Basin Recovery Implementation Program ... These two successful, ongoing cooperative partnership programs involve the States of Colorado, New Mexico, Utah and Wyoming, Indian tribes, federal agencies and water, power, and environmental interests ... "

Ben Shelly, President, The Navajo Nation

The Department of the Interior Recognizes the Recovery Programs' Benefits:

"The programs are engaged in the hard, day to day work of recovering endangered species ... The Upper Colorado program has become a national model for recovering endangered species while addressing the demand for water development to support growing western communities."

Secretary of the Interior Gale Norton, 2005

"These outstanding partnerships and cooperative efforts represent a fundamental way in which our Department provides stewardship for America with integrity and excellence."

Secretary of the Interior Dirk Kempthorne, 2008

"As we chart the future, we can turn around and go back to the ways of river management of the past, where it was too often every state for itself ... or we can continue to move forward together down the road of long-term, cooperative river management ... to find creative solutions to tough problems."

Secretary of the Interior Ken Salazar, 2010

"Our recovery programs in the Colorado River are wonderful examples of successful partnerships...In addition to improving the environment and providing that security to water users ..., these restoration projects also benefit local economies, and they create jobs. A Department of the Interior report has estimated that for every million dollars that we spend in river restoration, it creates about 30 jobs. Those are significant to the rural areas in which many of these projects are located."

**Anne Castle, Assistant Secretary for
Water and Science, 2011**

Endangered Species Act Compliance Streamlined for Water and Hydroelectric Power Projects

The Upper Colorado River and San Juan River Basin recovery programs respond to the challenge of water management by working with local, state, federal, and tribal agencies to meet the needs of people and endangered fish. The programs' goal is to achieve full recovery (delisting) of the endangered fishes, not just to avoid jeopardy (offset impacts of water project depletions) under the Endangered Species Act (ESA). The recovery programs provide ESA compliance for water development and management activities for federal, tribal, and non-federal water users. This includes Bureau of Reclamation-operated dams and projects across the Upper Colorado River Basin. Responsibilities to offset water project depletion impacts do not fall on individual projects or their proponents.

The recovery programs provide ESA compliance for 2,320 water projects depleting more than 3.7 million acre-feet per year. No lawsuits have been filed on ESA compliance for any of these water projects.

Upper Colorado River Endangered Fish Recovery Program Summary of Endangered Species Act Section 7 Consultations 1/1988 through 12/31/2011

State	Number of Projects	Historical Depletions	New Depletions	Total
		Acre-Feet/Yr	Acre-Feet/Yr	Acre-Feet/Yr
Colorado	1167	1,915,682	206,416	2,122,098
Utah	219	517,670	91,051	608,721
Wyoming	377	83,498	34,248	117,746
Regional	238	(regional)	(regional)	0
Total	2,001	2,516,850	331,715	2,848,565

San Juan River Basin Recovery Implementation Program Summary of Endangered Species Act Section 7 Consultations 1/1992 through 12/31/2011

State	Number of Consultations	Depletions Acre-Feet/Yr
New Mexico	21	653,753
Colorado	284	217,788
Utah	14	9,146
Total	319	880,687

The Programs Rely on Recovery Goals to Guide Recovery Actions and Measure Success

The overall goal for recovery of the four endangered fishes is to achieve naturally self-sustaining populations and protect the habitat on which those populations depend. Specific, basin-wide recovery goals for humpback chub, bonytail, Colorado pikeminnow, and razorback sucker were approved by the U.S. Fish and Wildlife Service (USFWS) on August 1, 2002, and are currently in revision to incorporate new information.

The recovery goals describe conditions necessary for downlisting the fishes from endangered to threatened and for removing them from Endangered Species Act (ESA) protection (delisting). The goals:

- 1) Establish objective, measurable criteria that considers demographic and genetic needs for naturally self-sustaining, viable populations (*Box 1*).
- 2) Identify site-specific management actions necessary to minimize or remove threats (*Box 2*).
- 3) Provide estimates of the time to achieve recovery.

Downlisting and delisting the fishes will be considered once the necessary management actions are achieved, and fish populations reach and maintain the required demographic and genetic self-sustaining standards. A summary of the recovery programs' progress toward meeting the first recovery threshold, i.e., downlisting, follows (*Box 3*).

Box 1. DEMOGRAPHIC CRITERIA FOR RECOVERY	
DOWNLISTING	DELISTING
Colorado pikeminnow	
Over a 5-year monitoring period: <ul style="list-style-type: none"> •Maintain the Upper Basin metapopulation •Maintain populations in the Green River and Upper Colorado River sub-basins ("no net loss") •Green River sub-basin population >2,600 adults •Upper Colorado River sub-basin population >700 adults •Establish 1,000 age 5+ subadults in the San Juan River 	For 7 years beyond downlisting: <ul style="list-style-type: none"> •Maintain the Upper Basin metapopulation •Maintain populations in the Green River and Upper Colorado River sub-basins ("no net loss") •Green River sub-basin population >2,600 adults •Upper Colorado River sub-basin population >1,000 adults OR Upper Colorado River sub-basin population >700 adults and San Juan River population >800 adults
Bonytail	
Over a 5-year monitoring period: <ul style="list-style-type: none"> •Maintain reestablished populations in the Green River and Upper Colorado River sub-basins, each >4,400 adults •Maintain established genetic refuge of adults in Lower Basin •Maintain two reestablished populations in the Lower Basin, each >4,400 adults 	For 3 years beyond downlisting: <ul style="list-style-type: none"> •Maintain populations in the Green River and Upper Colorado River sub-basins, each >4,400 adults •Maintain genetic refuge of adults in Lower Basin •Maintain two populations in the Lower Basin, each >4,400 adults
Razorback sucker	
Over a 5-year monitoring period: <ul style="list-style-type: none"> •Maintain reestablished populations in Green River sub-basin and EITHER in Upper Colorado River sub-basin or San Juan River, each >5,800 adults •Maintain established genetic refuge of adults in Lake Mohave •Maintain two reestablished populations in Lower Basin, each >5,800 adults 	For 3 years beyond downlisting: <ul style="list-style-type: none"> •Maintain established populations in Green River sub-basin and EITHER in Upper Colorado River sub-basin or San Juan River, each >5,800 adults •Maintain genetic refuge of adults in Lake Mohave •Maintain two populations in Lower Basin, each >5,800 adults
Humpback chub	
Over a 5-year monitoring period: <ul style="list-style-type: none"> •Maintain the six populations ("no net loss") •One core population in Upper Basin > 2,100 adults •One core population in Lower Basin > 2,100 adults 	For 3 years beyond downlisting: <ul style="list-style-type: none"> •Maintain the six populations ("no net loss") •Two core populations in Upper Basin > 2,100 adults •One core population in Lower Basin > 2,100 adults

Box 2. MANAGEMENT ACTIONS FOR RECOVERY

The recovery programs implement actions to remove threats and achieve the recovery goals in five major program elements:

1. **Habitat Management:** Identify and provide adequate instream flows.
2. **Habitat Development:** Restore and maintain habitat.
3. **Nonnative Fish and Sportfishing:** Reduce the threat of certain nonnative fish species while maintaining sportfishing opportunities.
4. **Endangered Fish Propagation and Stocking:** Produce genetically diverse fish in hatcheries and stock them in the river systems.
5. **Research, Monitoring, and Data Management:** Provide data on life-history requirements of the endangered fishes, and monitor progress toward recovery.



Crews from Colorado State University use electrofishing to capture Colorado pikeminnow in the mouth of Vermillion Creek in the Upper Green River, Colorado.

Box 3. RECOVERY PROGRAMS' PROGRESS TO RECOVERY

Species	Timeline to Downlist/Delist (Years)	Progress Made on Management Actions ¹ to Remove Threats to Recovery and Status of Meeting Demographic Criteria
Colorado Pikeminnow	2013/ 2020	Management Actions: 78% of the actions required by USFWS to downlist have been met or partially met. Demographics: IF, Colorado (CO) and Green (GR) river populations do not decline significantly from current levels and 1,000 age-5 fish are present in San Juan River (moderate to high likelihood) – downlisting could occur in 2013.
Bonytail	2020/ 2023	Management Actions: 72% of the actions required by USFWS to downlist have been met or partially met. Demographics: Stocking programs in the GR and CO rivers have been marginally successful. There is not enough new information to suggest the 2020 deadline should be revised.
Razorback Sucker	2020/ 2023	Management Actions: 85% of the actions required by USFWS to downlist have been met or partially met. Demographics: Stocking programs in the GR, CO, and San Juan rivers appear to be successful. Although neither Program has initiated population estimation, current information indicates the 2020 timeline is still achievable.
Humpback Chub	2016/ 2019	Management Actions: 60% of the actions required by USFWS to downlist have been met or partially met. Demographics: IF, over a 5-year period, one of the five Upper Basin populations rebounds to meet the “core criteria” of 2,100 adults, and the other Upper Basin populations increase (low to moderate likelihood) - downlisting could occur in 2016.

¹As per Section 4 of the ESA, every 5 years the USFWS is required to provide a status review (aka a ‘report card’) of each listed species’ progress toward recovery. This table reflects information included in finalized 5-year reviews for Colorado pikeminnow and humpback chub (found at: <http://www.coloradoriverrecovery.org/documents-publications/foundational-documents/recovery-goals.html>) and draft reviews for bonytail and razorback sucker.

Status of Endangered Fishes

The recovery programs monitor reproduction, growth, survival, and abundance of endangered fishes in the wild. Results are used to track progress toward achieving recovery goals and to assess the effectiveness of management actions.

The core of the U.S. Fish and Wildlife Service's recovery goals for each species is achieving a sufficient number and size of self-sustaining populations that will persist. To achieve this, wild or re-introduced adults must survive and reproduce. Recruitment of young fish into the adult population must then maintain the minimum population level (demographic criteria) identified in the recovery goals (*see page 6*).

COLORADO PIKEMINNOW (*Ptychocheilus lucius*)

Upper Colorado Program

◆ Wild Colorado pikeminnow populations occur in the Green and Colorado river sub-basins of the Upper Colorado River.

- The population in the Green River is the largest (*Figure 1*). The Service is re-evaluating recent survival estimates to determine the appropriate numbers of adults needed to downlist. The population in the Upper Colorado River sub-basin is smaller (*Figure 2*), but appears to be more stable. A recent report identified that several individuals have moved between these two populations indicating more crossover than previously thought.

- Researchers caution that despite recent increases in adult numbers in both populations, fluctuations (i.e., a downward turn) will likely occur because of natural population dynamics.

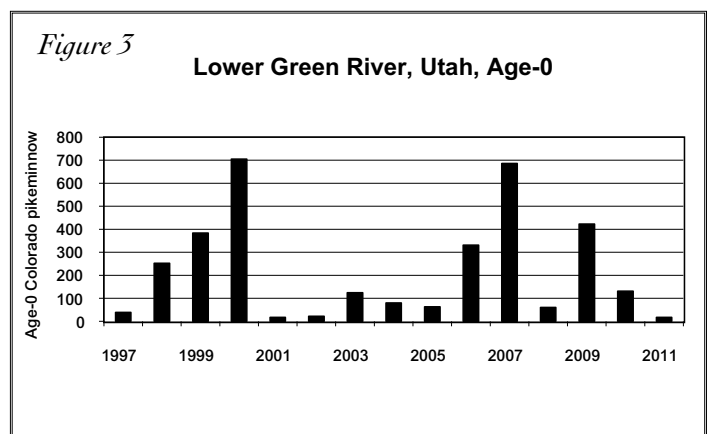
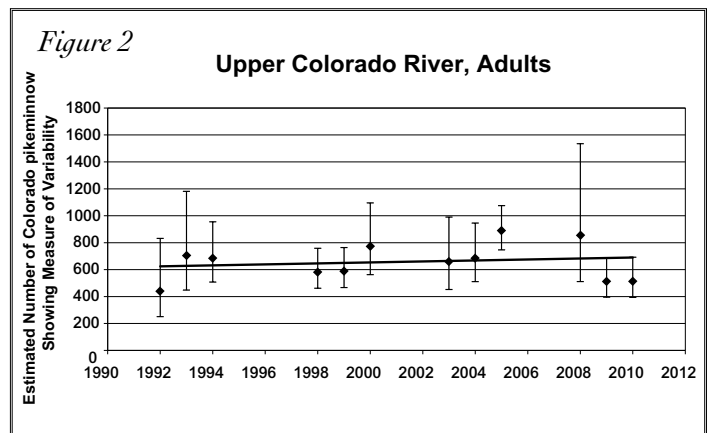
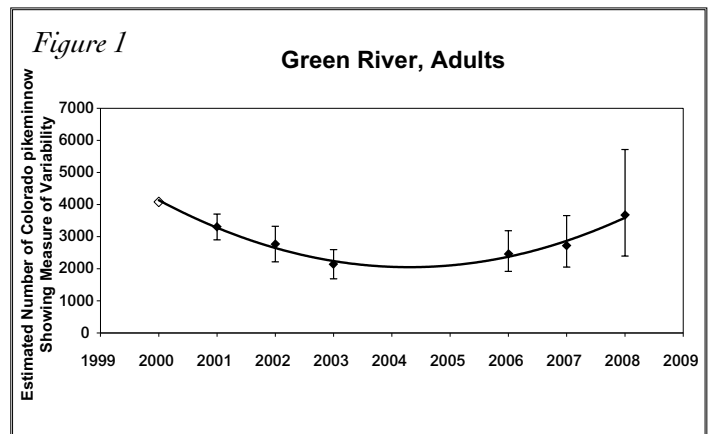
◆ Young of the year (age-0) Colorado pikeminnow are monitored every fall in two reaches of the Green River and one reach of the Colorado River.

- Catch of age-0 fish in the lower reach of the Green River has been variable, with strong year classes seen in 2000, 2007, and 2009 (*Figure 3*).

San Juan Program

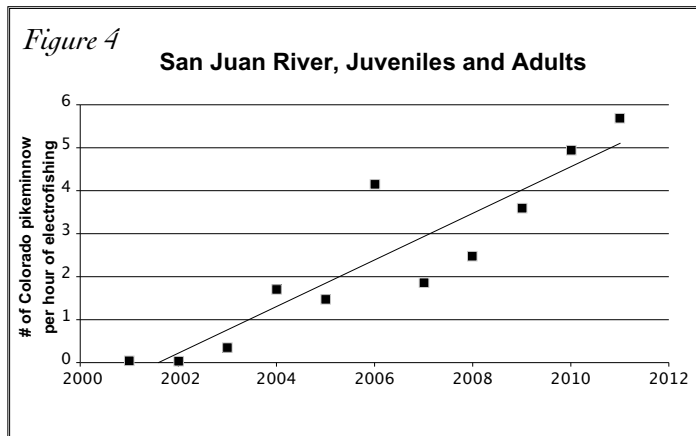
◆ Researchers are reestablishing a population of Colorado pikeminnow in the San Juan River. Stocking efforts have been very successful.

- Annual stocking targets for age-0 and juvenile Colorado pikeminnow have been met or exceeded over the last five years.



- Annual monitoring efforts have documented increased catch rates of stocked juvenile and adult Colorado pikeminnow since the late 1990s, indicating that stocked fish are persisting in the San Juan River (Figure 4).

- Colorado pikeminnow larvae have been detected



infrequently in low numbers since 1993, with a record number of 29 larvae collected in 2011.

- In recent years, researchers have discovered Colorado pikeminnow using habitats in Yellow Jacket Canyon and McElmo Creek, a San Juan River tributary.



U.S. Fish and Wildlife Service Biologist Jason Davis holds a Colorado pikeminnow captured in the San Juan River.

BONYTAIL (*Gila elegans*)

Upper Colorado Program

◆ Stocking continues to reestablish populations in the Upper Colorado River Basin. When the Upper Colorado Program was established, the bonytail had essentially disappeared and little was known of its habitat requirements. Key to bonytail recovery is research and monitoring of stocked fish to determine life history needs.



U.S. Fish and Wildlife Service Biologist Ben Schleicher holds a bonytail captured in the Gunnison River in western Colorado in 2011.

- To date, fewer stocked bonytail have been recaptured than razorback sucker. Researchers continue to experiment with pre-release conditioning as well as exploring alternative release sites to improve their survival.

- All stocked fish receive an internal microchip tag before being released in the wild. Since 2009, increasing numbers of bonytail have been detected at locations throughout the Upper Colorado River Basin where stationary tag-reading antennas are used.

Program's Performance to Meet Annual Bonytail Stocking Goals (%)

	Green River		Colorado River
	Middle	Lower	
2007	101	101	105
2008	143	100	111
2009	101	100	95
2010	53 ¹	100	46 ¹
2011 ²	255	147	161

Shaded cells indicate years when the stocking goal was not met (i.e., <100%).

¹ Approximately half of these bonytail scheduled for stocking in 2010 were held in the hatchery to ensure they were disease-free. Subsequent testing cleared these fish for release in 2011.

² Percentages in 2011 are considerably higher as a result of the fish held over from 2010.

RAZORBACK SUCKER (*Xyrauchen texanus*)

◆ When the recovery programs were established, numbers of wild razorback sucker had diminished to a few hundred adults in the Green River system and were considered lost from the Upper Colorado and San Juan rivers. Clearly, hatchery-produced fish would be needed to reestablish the species in the wild and preferred habitat would need to be restored via flow management and floodplain protection.

Programs' Performance to Meet Annual Razorback Sucker Stocking Goals (%)

	Green River		Colorado/Gunnison Rivers	San Juan River
	Middle	Lower		
2007	111	86	102	203
2008	118	102	130	39 ¹
2009	151	51 ²	181 ²	74 ³
2010	110	101	100	250
2011	91	126	121	165

Shaded cells indicate years when stocking goal was not met (i.e., <100%)

¹A portion of these fish were held over at Uvalde National Fish Hatchery to determine if survival could be improved by stocking larger fish in 2009 and 2010.

²Permit not in place for Grand Valley to stock at Green River, Utah; therefore, fish were stocked into Colorado and Gunnison rivers.

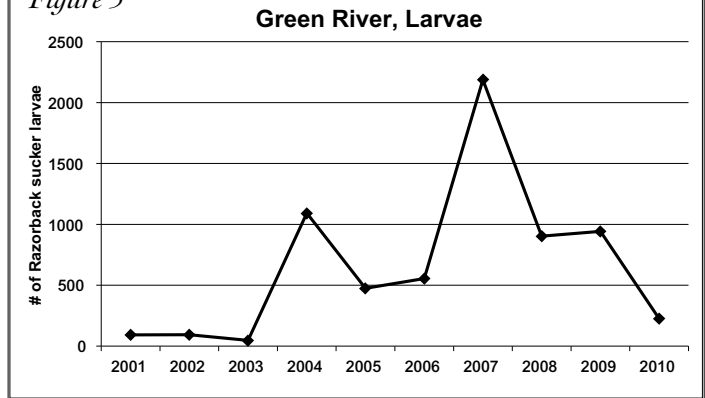
³4,021 razorback suckers from this year class were held in the hatchery and stocked in 2010 to experiment with alternative stocking seasons.

- The recovery programs are revising stocking strategies to incorporate recent stocked fish survival information. New data indicates that fall is the best time to stock and that fish should be at least 12 inches in length.

- Fish stocked in the Green, Colorado, and San Juan rivers are recaptured in reproductive condition and often in spawning groups. Captures of larvae in the Green (*Figure 5*), Gunnison, Colorado, and San Juan (*Figure 6*) rivers document reproduction.

- Some larvae are surviving through their first year as evidenced by occasional captures of juvenile fish in the Green, Gunnison, and San Juan rivers. This is an important indicator that larvae are surviving to become part of reestablished populations as required for recovery.

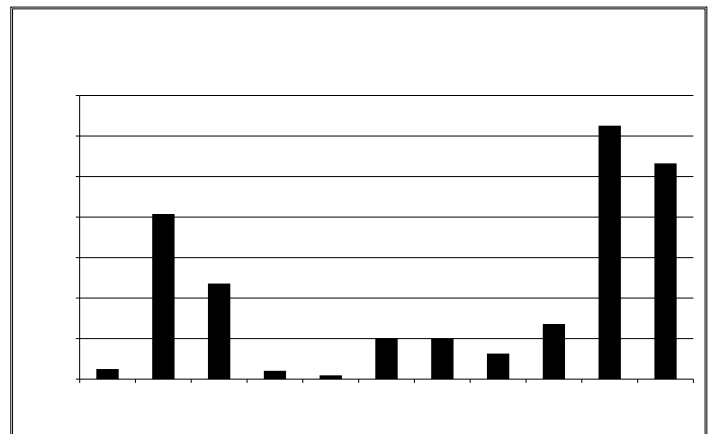
Figure 5



- The Upper Colorado Program is working with the Bureau of Reclamation to implement recent findings that indicate releases from Flaming Gorge Dam can be timed to better assist razorback sucker recovery.

- In spring 2011, while sampling for Colorado pikeminnow in the White River (a tributary to the Green River) of Utah, researchers found razorback sucker in spawning condition. In June, researchers collected razorback sucker larvae in White River backwaters, which confirmed for the first time that spawning occurred in this river.

- An initial survey of the San Juan arm of Lake Powell in 2011 detected 75 razorback suckers. The purpose of the research was to assess how many razorback suckers stocked in the San Juan River have been lost to Lake Powell after passing over a waterfall that formed at the interface between the river and lake.





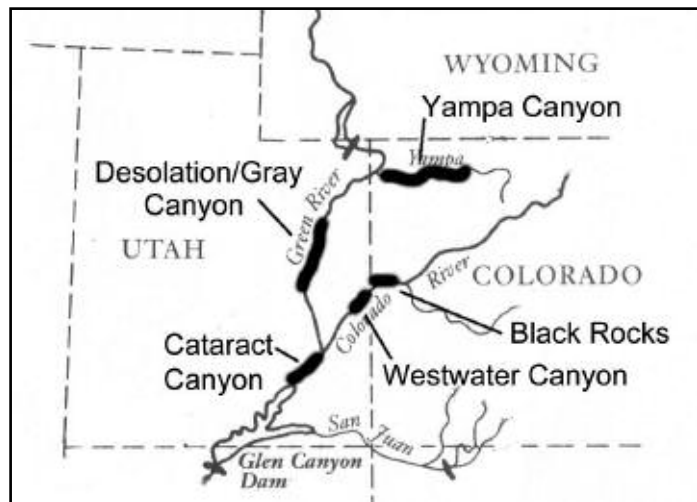
Biologist James Morel, Navajo Nation Department of Fish and Wildlife, with an adult razorback sucker collected from Lake Powell during 2011 surveys.



Researchers collected endangered fish in Lake Powell this year. The fish likely entered the lake via this waterfall that connects the San Juan River to the lake.

HUMPBACK CHUB (*Gila cypha*)

◆ Five wild populations inhabit canyon-bound sections of the Colorado, Green, and Yampa rivers. Downward trends in some populations (particularly Yampa Canyon and Desolation Canyon in the Green River) have been attributed to increased abundance of nonnative fish and habitat changes associated with dry weather and low river flows. Individuals from both populations have been brought into the hatchery system to ensure that genetic diversity is preserved.



Locations of the five humpback chub populations in the Upper Basin.

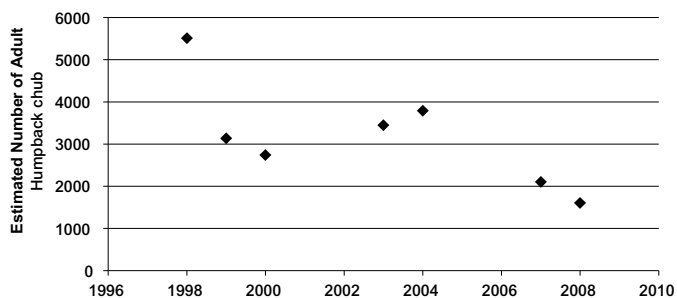
- The humpback chub population in Cataract Canyon is small, but appears to be stable. The U.S. Fish and Wildlife Service will require sustained improvement over the course of five years in the other four Upper Basin populations before it will consider downlisting (*see page 6*).

- The strongest population in the Upper Colorado River Basin comprises two groups in Black Rocks and

Westwater Canyon (*Figure 7; depicts combined estimate*). Both populations experienced declines about 13 years ago and have remained relatively stable since.

Figure 7

Black Rocks - Westwater Canyon, Colorado River, Adults



- Researchers are optimistic that a return to average hydrologic conditions throughout the basin during 2008-2011, coupled with ongoing nonnative fish management, explains recent observations of successful native chub reproduction.



U.S. Fish and Wildlife Service Biologist Tom Barnes captured this humpback chub in Black Rocks Canyon on the Colorado River in Colorado.

State, Federal, and Tribal Facilities Help Reestablish Endangered Fish Populations

Genetically diverse, hatchery-produced fish are stocked to reestablish naturally self-sustaining populations of razorback sucker and bonytail in the Upper Colorado River system and razorback sucker and Colorado pikeminnow in the San Juan River. Stocked fish will contribute¹ to meeting the demographic criteria of the recovery goals. The recovery programs monitor survival and reproduction of stocked fish to evaluate and improve stocking strategies. In most cases, the facilities are exceeding their annual production targets (*see pages 9 and 10*).

Uvalde National Fish Hatchery
Uvalde, TX



Species: Razorback sucker
Target: 11,400, 12-inch
Stocked: San Juan River

Ouray National Fish Hatchery-Grand Valley Unit / Grand Junction, CO



Species: Razorback sucker
Target: 14,895 12-inch
Stocked: Gunnison, Colorado, and Lower Green rivers

J.W. Mumma Native Aquatic Species Restoration Facility / Alamosa, CO



Species: Bonytail
Target: 5,330, 8-inch
Stocked: Middle Green, Colorado, and Gunnison rivers

Wahweap State Fish Hatchery
Big Water, UT



Species: Bonytail
Target: 10,660, 8-inch
Stocked: Colorado, Middle, and Lower Green rivers

Navajo Agricultural Products Industry Ponds/near Farmington, NM



Species: Razorback sucker
Target: 6,000, 12-inch
Stocked: San Juan River

Dexter National Fish Hatchery & Technology Center / Dexter, NM



Species: Colorado pikeminnow
Target: 400,000, Age 0 fingerlings
Stocked: San Juan River



Ouray National Fish Hatchery-Randlett Unit / Vernal, UT

Species: Razorback sucker
Target: 14,895, 12-inch
Stocked: Middle and Lower Green rivers

Species: Humpback chub
Goal: Maintain individual fish from two populations to preserve genetic diversity.

Species: Razorback sucker, bonytail
Target: Varies by species and facility needs
Goal: Maintain broodstock; provide fish to grow-out facilities to meet stocking goals for all Upper Basin rivers.

¹All four species of endangered fish are long-lived (up to 40 years). The U.S. Fish and Wildlife Service will include hatchery-produced fish in population estimates after those populations have been determined to be "self-sustaining."

Cooperative Water Management Provides Flows for Endangered Fishes

The recovery programs use research, monitoring, and adaptive management to identify, evaluate, and revise flow recommendations to meet the flow-related life-history and habitat requirements of the endangered fishes. Program partners provide instream flows needed to recover the endangered fishes consistent with state water laws and interstate compacts.

Innovative solutions provide instream flows for the endangered fishes while meeting water needs of growing western communities. Program partners cooperatively manage water in accordance with state laws, individual and tribal water rights, and interstate compacts. This is accomplished through water leases and contracts, coordinated water releases from upstream reservoirs, efficiency improvements to irrigation systems, and reoperation of federal dams and reservoirs.



**Coordinated Water Releases (1997-2011)
Benefit Endangered Fish in the Colorado River**

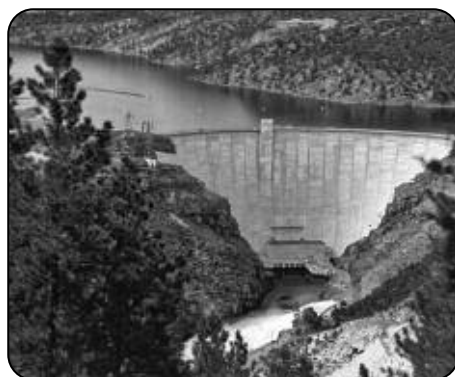
Reservoirs	Acre-Feet
Granby	39,914
Green Mountain	532,000
Palisade Bypass	93,038
Ruedi	272,287
Williams Fork	89,342
Willow Creek	9,852
Windy Gap	3,718
Wolford Mountain	137,879
Total	1,178,030

Since 2002, improvements to the Grand Valley Project canal system in western Colorado have improved canal efficiency and conserved an average 38,905 acre-feet of water per year in the Colorado River. Conserved water benefits endangered fishes while meeting irrigation demands.

From 1997 through 2011, operators of these Colorado reservoirs have coordinated releases to provide more than 1.1 million acre-feet of water to enhance spring and summer flows in the Colorado River to improve habitat for the endangered fishes.



A 13,000 acre-foot enlargement of Elkhead Reservoir in northwest Colorado completed in 2006 makes 5,000 acre-feet of permanent water and 2,000 acre-feet of leased water available each year to enhance summer base flows for endangered fishes in the lower Yampa River.



The Bureau of Reclamation operates Flaming Gorge Dam in northeastern Utah under a Record of Decision signed in 2006 to help recover the endangered fishes. Year-round operations provide habitat for endangered fishes in the Green River in Utah.



The Bureau of Reclamation operates New Mexico's Navajo Dam under a Record of Decision signed in 2006 to help recovery efforts by providing and protecting instream flows to benefit endangered fishes in the San Juan River.

Capital Projects Important to Restoring Endangered Fish Populations

The recovery programs work cooperatively with American Indian tribes, water and power customers, and local landowners to improve endangered fish habitat. Habitat restoration and maintenance includes “undoing” habitat fragmentation through construction and operation of fish passages at irrigation diversion dams; preventing fish from entering and becoming trapped in irrigation diversion canals through construction and operation of fish screens; and acquisition, restoration, and management of floodplain habitat to serve primarily as fish nursery areas.



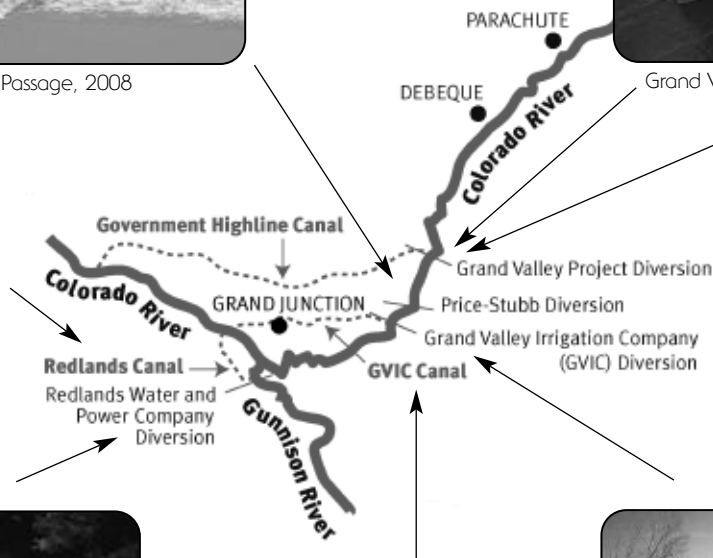
Price-Stubb Fish Passage, 2008



Grand Valley Project Fish Passage, 2004



Redlands Fish Screen, 2005



Grand Valley Project Fish Screen, 2007



Redlands Fish Passage, 1996



GVIC Fish Screen, 2002

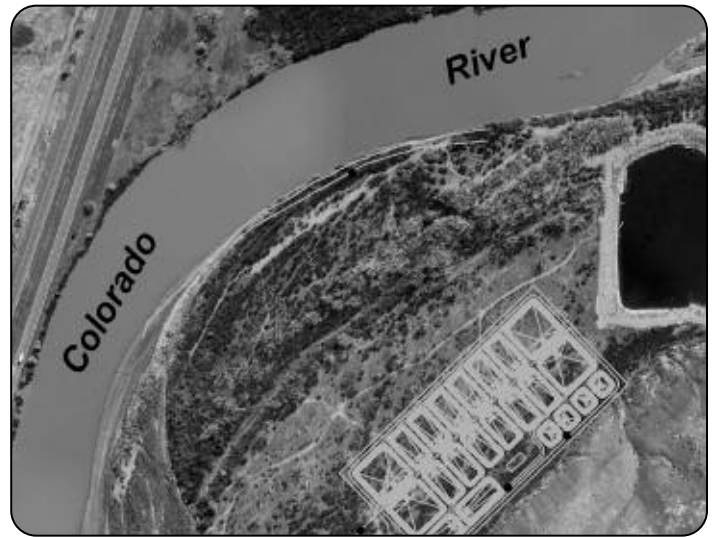


GVIC Fish Passage, 1998

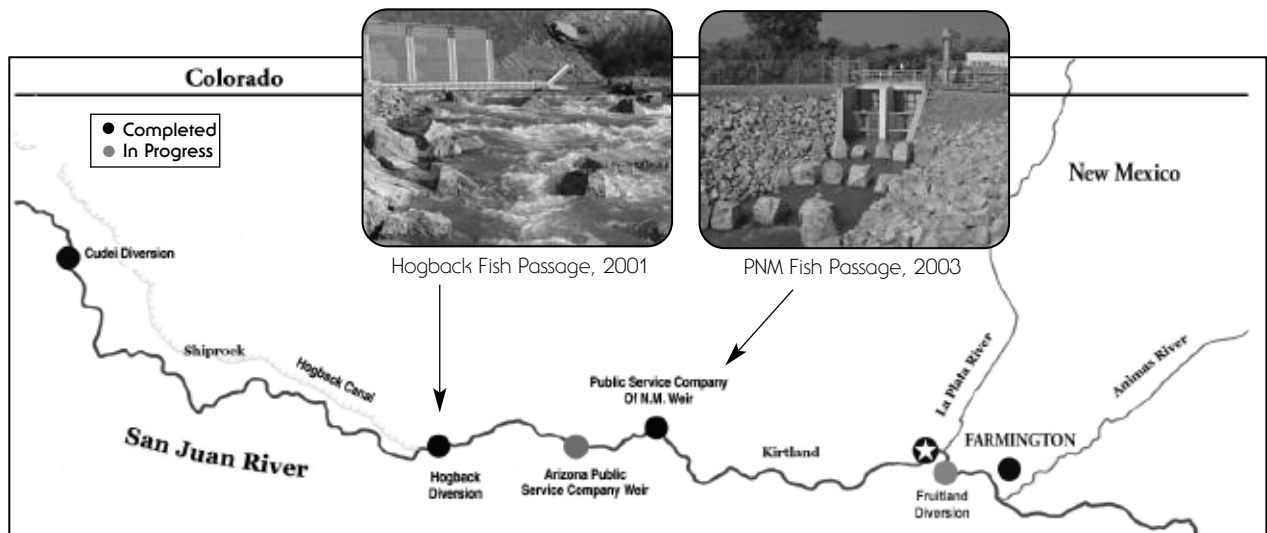
The majority of the Upper Colorado Program’s construction projects needed to recover the endangered fishes are complete. These include fish passages and screens at the Redlands Water and Power Company, Grand Valley Irrigation Company, Grand Valley Project, and Price-Stubb irrigation diversions in western Colorado. These fish passages contribute to unimpeded access to about 340 miles of designated critical habitat in the Colorado and Gunnison rivers. Once a fish screen is constructed at the Tusher Wash Diversion Canal on the Green River in eastern Utah, all major diversion canals currently identified in the recovery goals for the Upper Colorado River system will be screened.



About 2,700 acres of restored floodplain habitat in the Upper Colorado River Basin are managed for all life stages of endangered fish.



Horsethief Canyon Native Fish Facilities in western Colorado will include 22 grow-out ponds for endangered razorback sucker. Pond construction is slated for completion in summer 2012.



Fish access has been restored to an additional 36 miles of critical habitat on the San Juan River with the construction of passages at the Public Service Company of New Mexico (PNM) Weir and the Hogback Diversion Dam, and removal of the Cudei Diversion Dam. *Capital funds will also be used to permanently repair unstable rock formations at the Farmers Mutual Irrigation Ditch that could impact critical habitat.



Construction of a weir wall to prevent fish from entering the Hogback Irrigation Canal is expected to begin in 2012. Fish passages are being considered at the Arizona Public Service Company Weir and the Fruitland Diversion Dam.



The Nature Conservancy and Navajo Nation held a tour of restored backwater and side channel habitat sites along the San Juan River in 2011. The New Mexico Environment Department funded the project through a River Ecosystem Restoration Initiative Grant.



The Navajo Nation Department of Fish and Wildlife reported increased numbers of native fish using the fish passage at the Public Service Company of New Mexico Weir on the San Juan River in 2011. Of the 24,596 fishes encountered, a record 415 were Colorado pikeminnow.

Programs Balance Endangered Fish Recovery with Nonnative Fish Management

Predation or competition by nonnative fish species is a serious threat to the endangered fishes and perhaps the most challenging to manage. Currently, nonnative smallmouth bass and northern pike are the principal target species for management in the Green and Upper Colorado River systems. Nonnative channel catfish and common carp are targeted in the San Juan River.



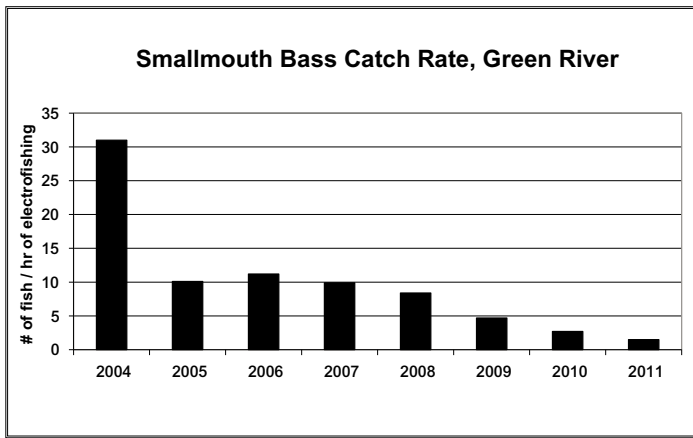
Northern pike are a voracious nonnative predator that can eat any fish up to half their body length. Mitch Allen, U.S. Fish and Wildlife Service biologist, holds a specimen collected in the Yampa River in northwestern Colorado.



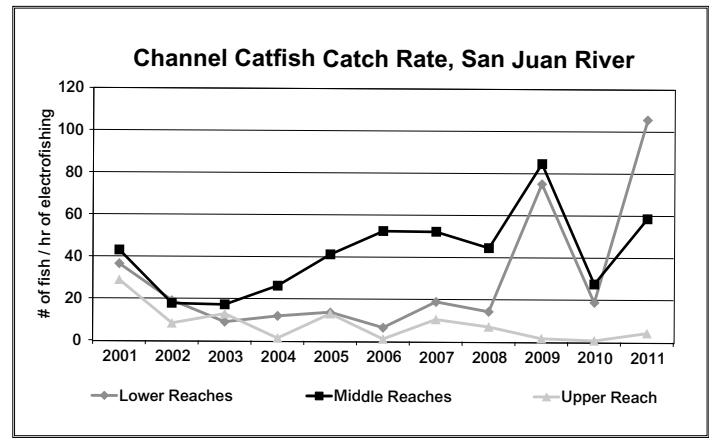
U.S. Fish and Wildlife Service Biologist Bobby Duran and other researchers are seeing fewer large, adult channel catfish in the San Juan River due to removal efforts begun in 2001.

Progress to reduce the abundance of the target nonnative fish species since 2000 is summarized below.

River	Species	History and Current Status
Colorado (112 miles)	Smallmouth bass	<ul style="list-style-type: none"> Increases in abundance first observed in 2003; removal began in 2004. Abundance steadily declined from 2004–2009; more removal passes since 2007 to increase captures. Largemouth bass and northern pike are an emerging problem; catch of young bass increased from 2004 - 2010 but declined slightly in 2011.
Green (198 miles)	Smallmouth bass	<ul style="list-style-type: none"> Increases in abundance first observed in 2003; removal began in 2004. Densities in the Green River are generally in decline (<i>see graph next page</i>), but increased in Desolation Canyon of the Green River in 2011. Higher flows in 2009–2011, coupled with removal efforts of adults, have decreased smallmouth bass spawning.
	Northern pike	<ul style="list-style-type: none"> Since removal began in 2001, abundance has been greatly reduced; however, a strong concentration of juveniles were found in one wetland.
Yampa (134 miles)	Smallmouth bass	<ul style="list-style-type: none"> Increases in abundance first observed in 2001; removal began in 2004. Little Yampa Canyon supports the highest densities of adult smallmouth bass and appears to be resistant to removal efforts. This area garners the Recovery Program's greatest attention. Despite persistent densities of smallmouth bass in some areas, native fish continue to rebound.
	Northern pike	<ul style="list-style-type: none"> Abundance steadily increased during the 1980s and 1990s; removal began in 1999. Ongoing removal efforts have shifted the size to smaller individuals. Future action – increased control efforts within upstream source areas.
San Juan (164 miles)	Channel catfish	<ul style="list-style-type: none"> Removal since 2001 has shifted channel catfish distribution and population structure. The population is now dominated by juveniles (<i>see graph next page</i>).
	Common carp	<ul style="list-style-type: none"> Removal since 2001 has reduced abundance to a level where Colorado pikeminnow and razorback sucker now outnumber common carp.



Researchers report a declining catch rate of smallmouth bass (larger than 4 inches) in an intensively sampled, 24-mile reach of the Green River in Utah; 2004-2011.



Catch rates for channel catfish in the upper San Juan River remained low in 2011. Increased catch rates in the middle and lower reaches may be due to increased channel catfish reproduction in response to removal efforts.

Nonnative fish management actions of the recovery programs recognize the dual responsibilities of state and federal wildlife agencies to conserve native fish species while providing sportfishing opportunities. In 2011, the programs focused on the importance of developing a long-term commitment to **prevention** in their Nonnative Fish Management Strategies as well as a recommitment to focusing **control** actions at the sources (spawning areas) of these problematic nonnative fish species.

In 2011, the Upper Colorado Program drafted an *Upper Colorado River Basin Nonnative and Invasive Aquatic Species Prevention and Control Strategy*. Currently under review, the draft strategy includes five main topics:

- ◆ **Prevention** - prevent the invasion of new nonnative aquatic species or the further spread of invasive species that are already present.
- ◆ **Eradication, Control, and Management** - promote elimination of invasive species introductions. Agencies should be poised with methods of early detection, eradication, or continuing control when / if this fails.
- ◆ **Research and Monitoring** - identify and implement additional or new equipment, techniques, or strategies needed to prevent, eradicate, or control problematic populations.
- ◆ **Policy and Enforcement** - ultimately inspire or invite adaptation or adoption of new regulations or enforcement strategies that recognize the threat these invasive species present.
- ◆ **Public outreach** - dedicate information and education efforts to increase public and agency awareness of nonnative fish management issues.



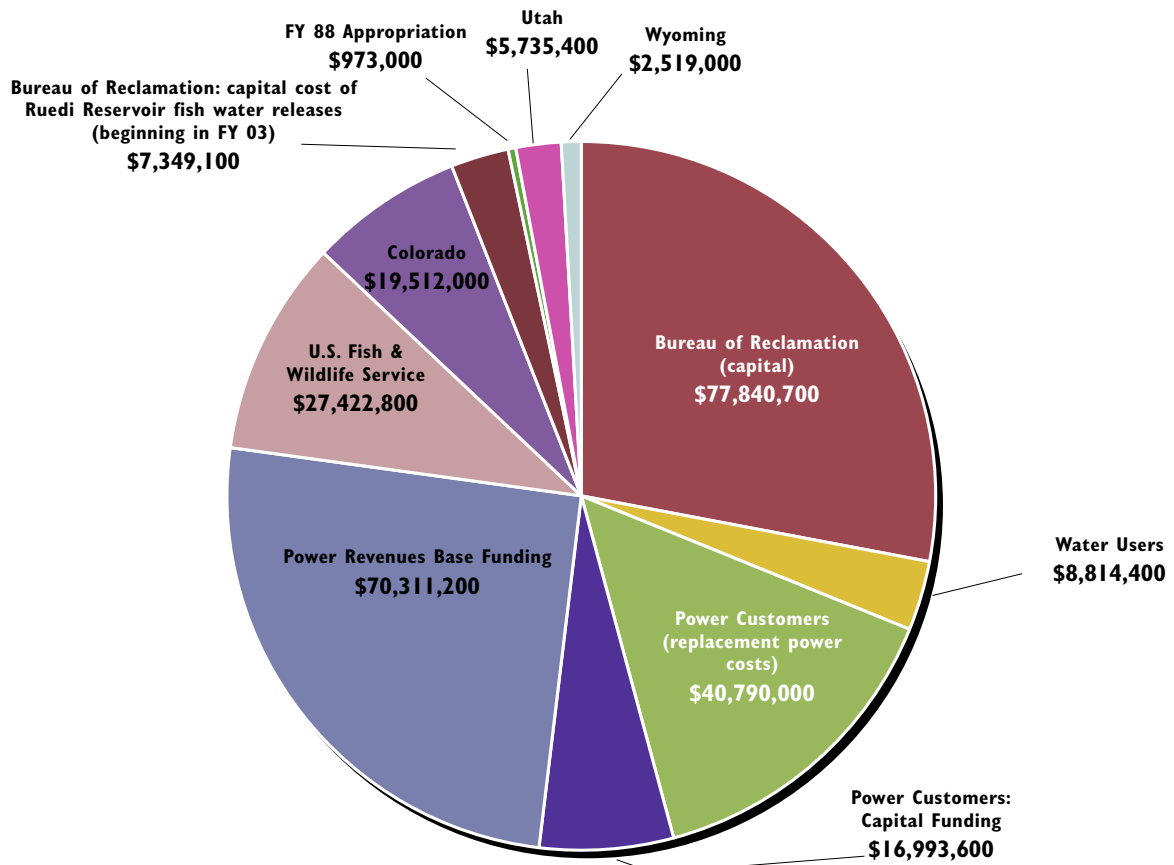
An adult smallmouth bass collected from the Yampa River and the regurgitated remains of an endangered bonytail demonstrate the direct impact of nonnative predators on endangered fish recovery.

San Juan Program partners are working out the final details of a nonnative fish stocking policy and expect to have an agreement in place in 2012. The policy is intended to promote sportfisheries throughout the San Juan River drainage that are fully compatible with efforts to recover endangered fish.

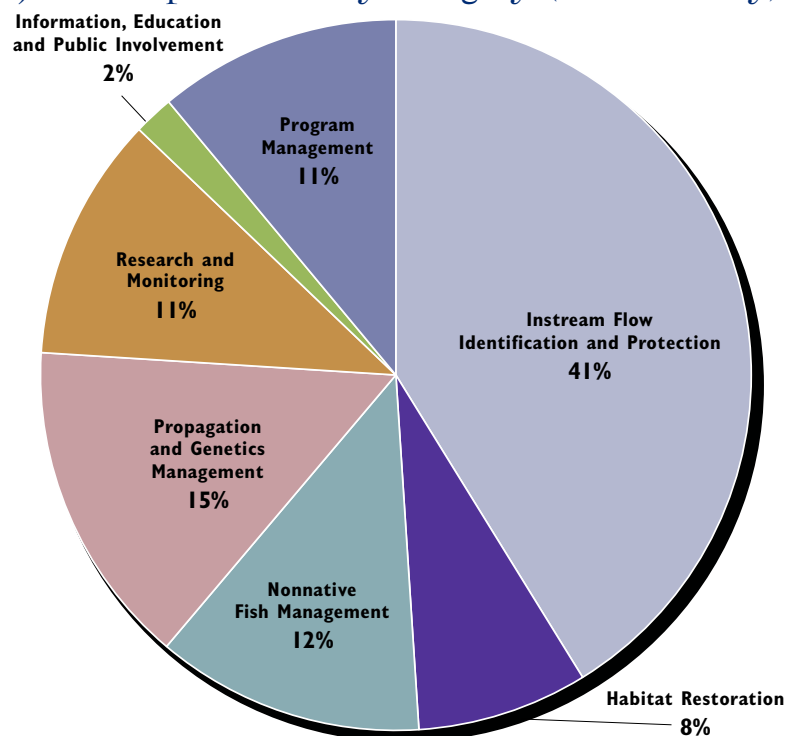
Expenditures

Upper Colorado River Endangered Fish Recovery Program

Total Partner Contributions = \$278,261,200 (FY 1989-2012)



Projected Expenditures by Category (FY 2012 only)

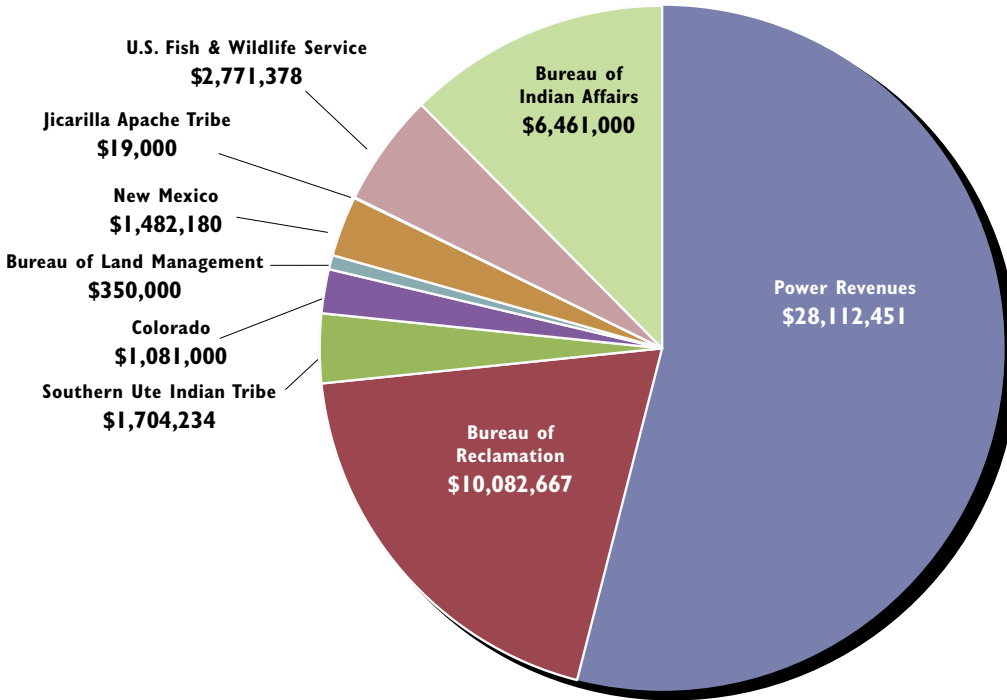


Expenditures

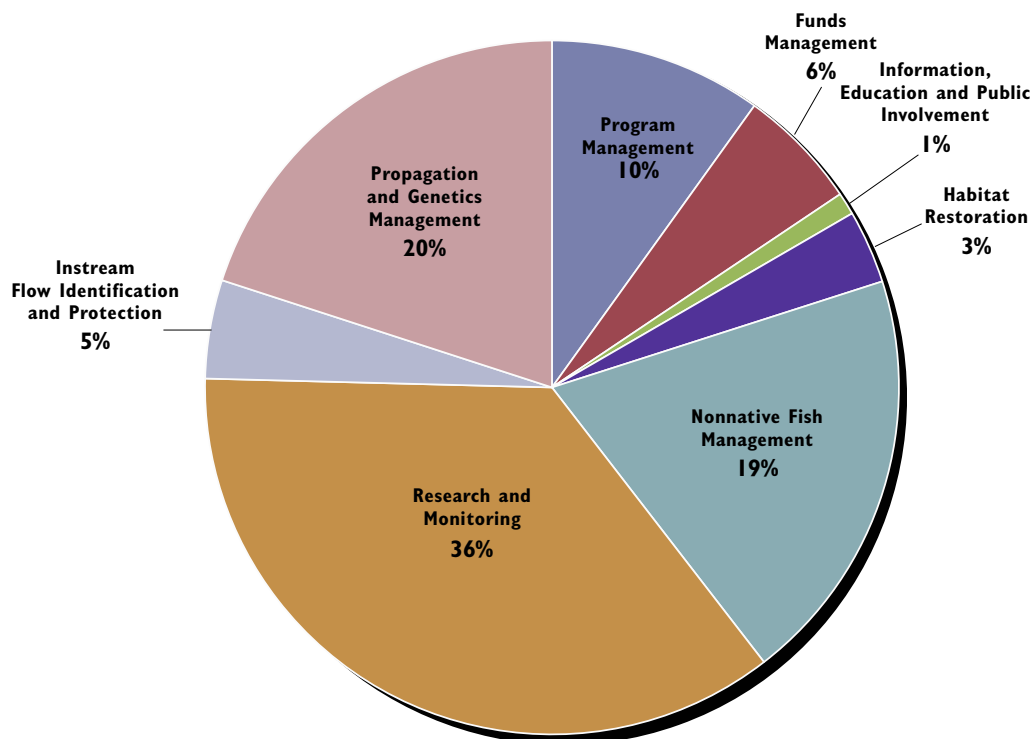
San Juan River Basin Recovery Implementation Program

Total Partner Contributions = \$52,063,910 (FY 1992-2012)

(Not including in-kind contributions)



Projected Expenditures by Category (FY 2012 only)



Cost-Sharing Commitments and Power Revenues

Support Species Recovery

Continuing the successes of the Upper Colorado River and San Juan River recovery programs depends on obtaining sufficient funding to conduct diverse and expensive recovery actions.

ANNUAL FUNDS

P.L. 106-392 authorized up to \$6 million per year (adjusted annually for inflation) of Colorado River Storage Project (CRSP) power revenues for base (non-capital) funding for the two programs through fiscal year 2011, **subject to reauthorization by the Congress thereafter**. That authority provided up to \$4 million for the Upper Colorado Program and up to \$2 million for the San Juan Program. Facility operation and maintenance and monitoring are authorized uses of power revenues, but **reauthorization is needed to allow power revenues to be used for other annual base funding costs** which include crucially important nonnative fish management, public involvement, and program administration activities.

The states, U.S. Fish and Wildlife Service, water users and CRSP power customers contribute substantial base funding to both programs each year.

CAPITAL FUNDS

Public Law (P.L.) 106-392 (2000), as amended, authorizes the Bureau of Reclamation to cost-share capital construction projects for both recovery programs. Water users, CRSP power customers, and the states of Colorado, New Mexico, Utah, and Wyoming provide non-federal cost-sharing funds.

Capital funds have been used to construct hatchery facilities (*see page 12*), fish passages and screens (*see pages 14-15*); complete water acquisition projects (*see page 15*); and restore floodplain habitat (*see page 15*).

Power Revenues Cost-Share (\$17 Million)

CRSP power revenues, totaling \$17 million, have been expended for capital construction projects. Consistent with authorization provided in P.L. 106-392, as amended, these revenues were treated as a non-federal contribution and are reimbursable costs assigned to power for repayment under Section 5 of the CRSP Act.

States Cost-Share (\$17 Million)

- Colorado's 2000 legislature created a Native Species Conservation Trust Fund. Its "Species Conservation Eligibility List" is annually funded by a joint resolution of the State's General Assembly.

Capital Construction Cost-Sharing for Upper Colorado and San Juan Programs

Upper Colorado Recovery Program	\$179 million
San Juan Recovery Program	\$30 million
Total	\$209 million*

*Sources of Revenue

<u>Federal</u>	<u>Non-Federal</u>	
Congress: \$88 million	Power Revenues:	\$17 million
	States:	\$17 million
	Water and Power:	\$87 million
		\$121 million

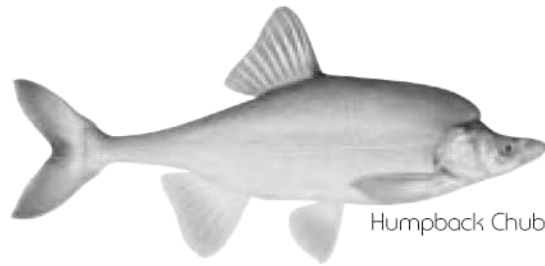
- New Mexico's legislature appropriated funds to meet the state's cost-share contributions.

- Utah's 1997 legislature created a Species Protection Account within the General Fund which receives Brine Shrimp Royalty Act-created revenue. In 2000, Utah dedicated 1/16th of a one cent general sales tax to water development projects and directed funding to the Upper Colorado Program.

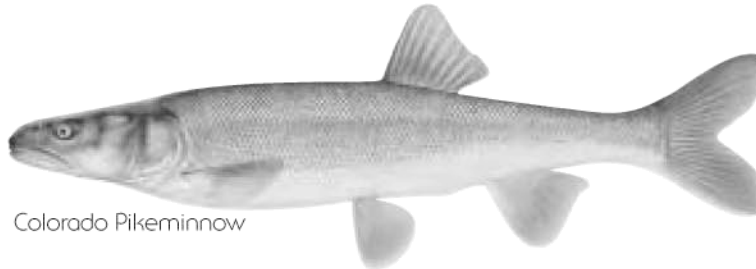
- Wyoming's legislature appropriated its funding share during its 1998 and 1999 sessions.

Capital Project Cost-Sharing by the States

	<u>Total Amount</u>	<u>Upper Colorado Program</u>	<u>San Juan Program</u>
Colorado	\$9.146 M	\$8.065 M	\$1.081 M
New Mexico	2.744 M	0.000 M	2.744 M
Utah	3.422 M	3.422 M	0.000 M
Wyoming	1.688 M	1.688 M	0.000 M
Total	\$17.000 M	\$13.175 M	\$3.825 M



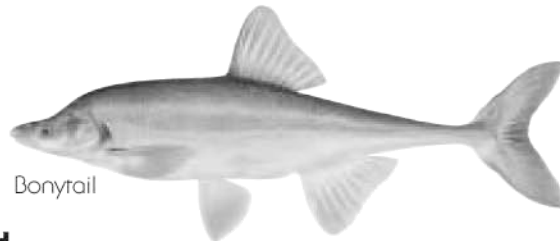
Humpback Chub



Colorado Pikeminnow



Razorback Sucker



Bonytail



Upper Colorado River Endangered Fish Recovery Program

Partners:

State of Colorado
State of Utah
State of Wyoming
Bureau of Reclamation
Colorado River Energy Distributors Association
Colorado Water Congress
National Park Service
The Nature Conservancy
U.S. Fish and Wildlife Service
Utah Water Users Association
Western Area Power Administration
Western Resource Advocates
Wyoming Water Association

Upper Colorado River Endangered
Fish Recovery Program
P.O. Box 25486, DFC
Denver, CO 80225
303-969-7322
303-969-7327 Fax
ColoradoRiverRecovery.org



San Juan River Basin Recovery Implementation Program

Partners:

State of Colorado
State of New Mexico
Jicarilla Apache Nation
Navajo Nation
Southern Ute Indian Tribe
Ute Mountain Ute Tribe
Bureau of Indian Affairs
Bureau of Land Management
Bureau of Reclamation
The Nature Conservancy
U.S. Fish and Wildlife Service
Water Development Interests

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Implementation Program
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505-346-2542 Fax
southwest.fws.gov/sjrip

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